Artillery Regimental Data System Advanced Development Model
ARDS ADM - Replication Issues

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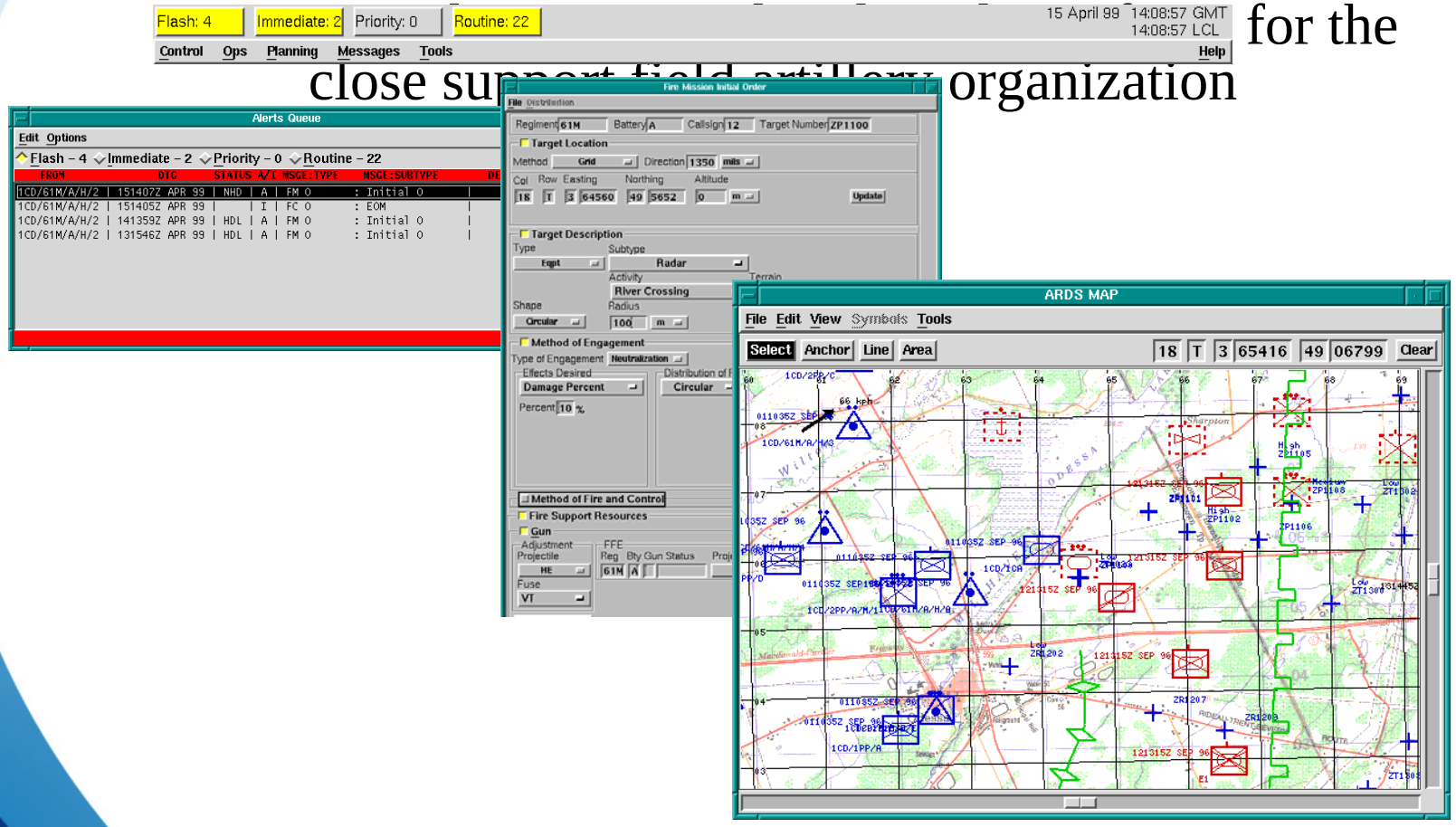
Plan

- ARDS ADM
- Constraints and design drivers
- Data Distribution & Replication
- Testing
- Conclusions

1. Some words on ARDS ADM

ARDS ADM

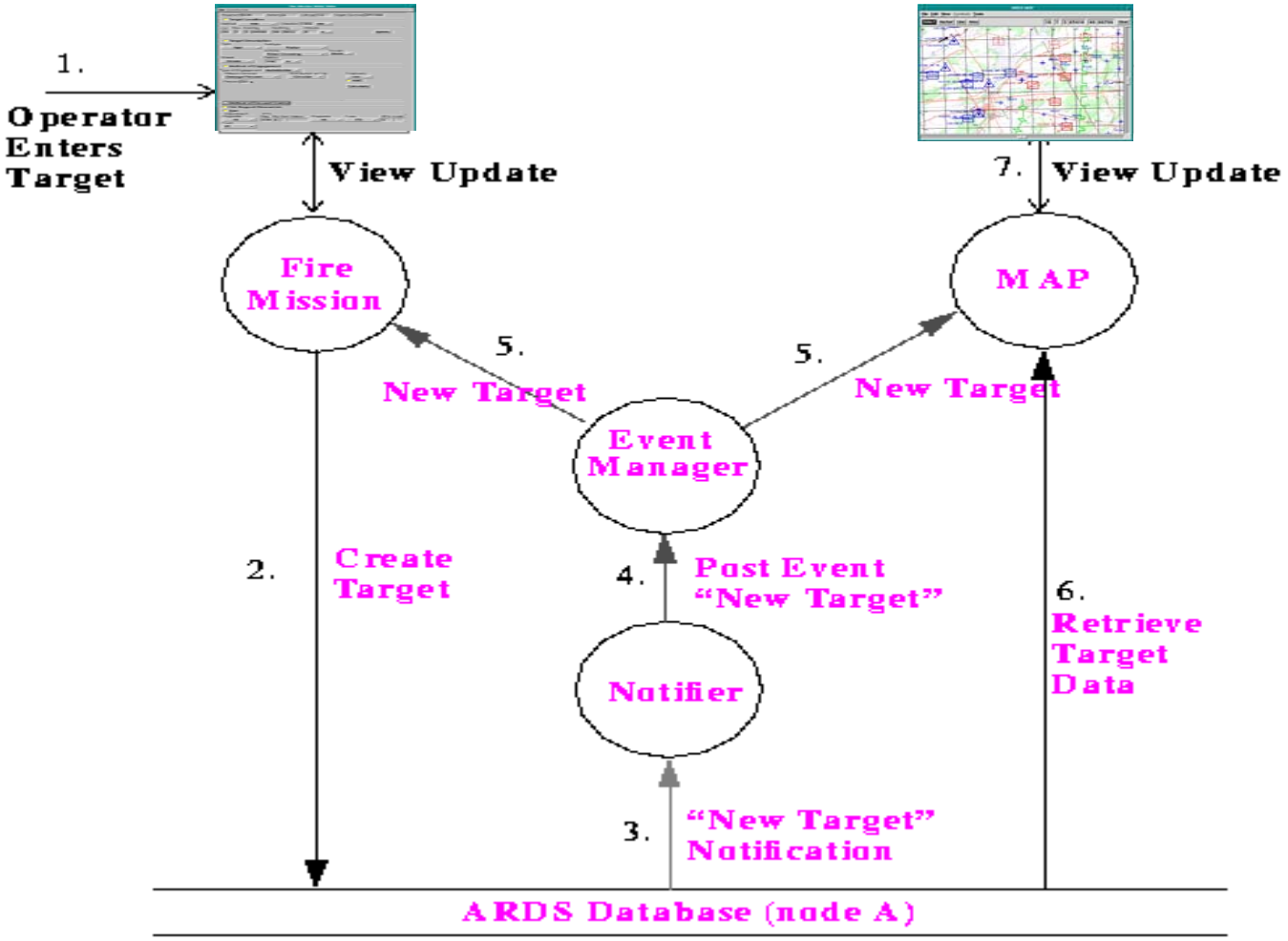


for the close support field artillery organization

Data Model Based

- Represents and manipulates model elements which correspond to real entities
- Provides integrated view of the battlefield situation
- Allows straightforward definitions of new views
- Maximises the opportunities for integration and interoperation with other forces and nations systems

Active database



2- Constraints and design drivers

Operational Environment Constraints

- Time is critical
  - Prioritization
- Survivability
  - Site Independence
  - Elimination of single points of failure
- Communications
  - Limited throughput
  - Key-up time
  - Collisions
  - Network Failure

Design Drivers

- Broadcast medium
- Data redundancy
- Recovering of lost/destroyed data
- Use of COTS
- Modularity
- Configurability

3 – Data Distribution & Replication

Replication issues

- COTS Replication not suitable
  - 1500 vs 200 bytes
  - 9 network interactions (radio key-up)
  - COTS solution optimized for consistency
  - Peer to peer

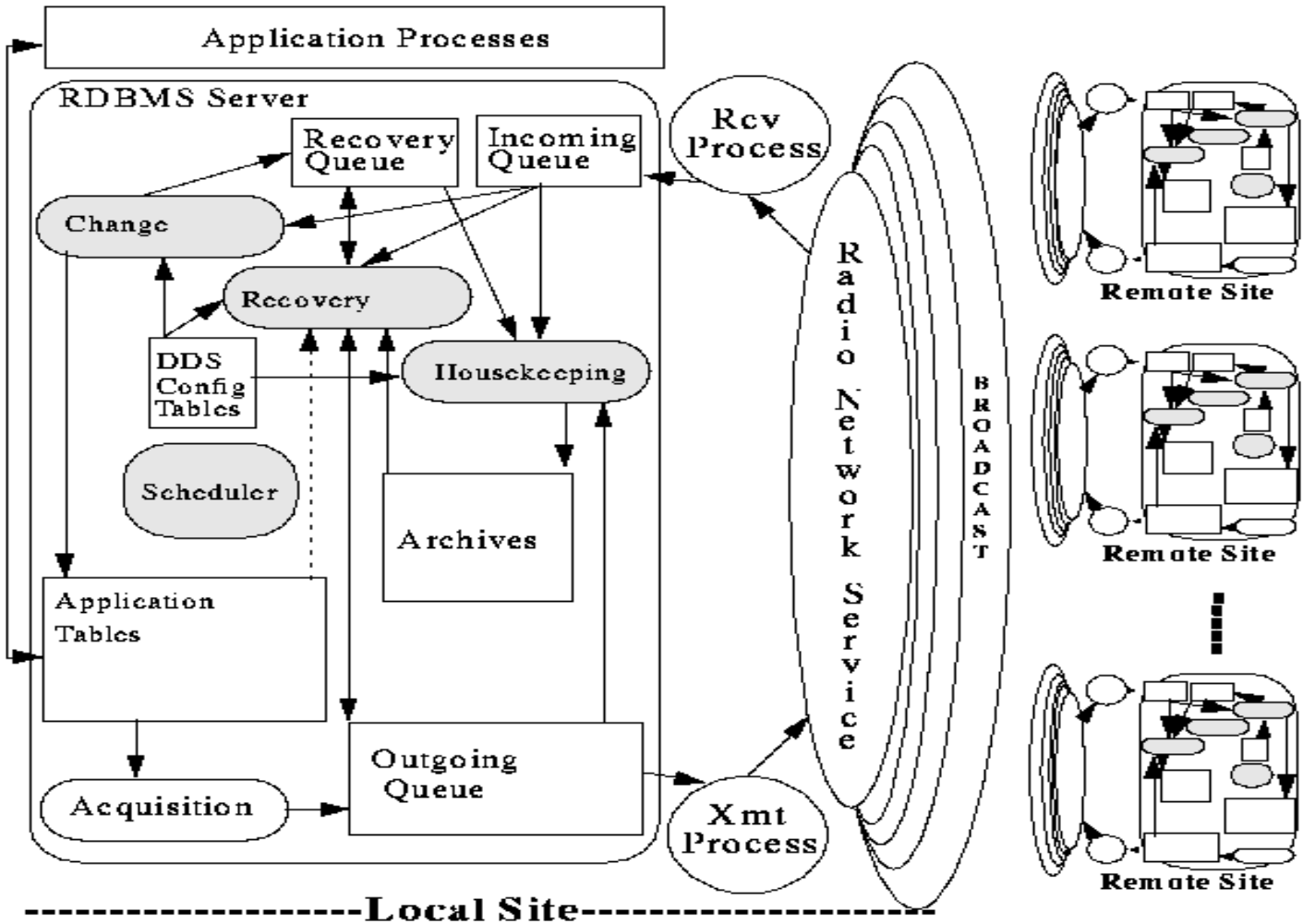
Replication Issues (Cont.)

- Transaction Integrity
- Data Ownership
- Connectionless
- Limited bandwidth

Replication Characteristics

- Solution layered on top COTS DBMS
- Trigger based post transaction
- Negative acknowledgment
- Store and forward
- Recovery
- Data Ownership models
  - Single, dynamic and shared

Data Distribution System (DDS)



4 - Testing

Description	Number of Tables	Number of Rows	DDS Message Size (bytes) (*Compressed*)	NET Tx Data Size (bytes)	Tx Time (secs) PRC25+RTU (@<100 bytes/sec)
Simple Transaction	2	2	110 (*104*)	144	3
Standard Transaction	6	10	551 (*385*)	441	6
Complex Transaction	12	22	1355 (*776*)	874	9

5 - Conclusions

- Tactical communications had limited throughput
- COTS Replication not adapted to military environment
- ARDS/ADM DDS is optimized for timeliness and for continued operations but data base consistency can not be guaranteed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